

**PARAPHYMATOCEROS HÄSSEL, GEN. NOV.  
(ANTHOCEROTOPHYTA)**

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**ABSTRACT**

*Paraphymatoceros* Hässel gen. nov. is described. It includes three species, *P. diadematus* Hässel sp. nov. from Chile, *P. hallii* (Austin) Hässel comb. nov. from USA and *P. minutus* (Mitt.) Hässel comb. nov. from South Africa. It differs from *Phymatoceros* Stotler, W. T. Doyle & Crand.-Stotl. in having a different kind of tuber, number of antheridia and spore wall ornamentation.

**KEYWORDS:** Anthocerotophyta, *Phymatoceros*, *Paraphymatoceros*, Chile, USA, South Africa.

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***Paraphymatoceros* Hässel gen. nov.**

*Thallus angustus, tenuis, tuberis scutiformibus marginalibus vel apicalibus viridulis vel auranticis. Capsula stomatophora cum columella. Sporae et pseudoelateres flavescentes vel nigrescentes, superficie distalis gibbosa, centrum areis triangularibus proximalibus baculis instructis. Differt a Phymatoceros tubera neque sphaerica neque pedunculata.*

Type species: *Paraphymatoceros diadematus* Hässel

This genus is distinct from *Phymatoceros* Stotler, W. T. Doyle & Crand.-Stotl. by the antheridia which are more numerous per cavity, the tubers present under the notch of growing points at wide incipient lobes or at tips of narrow lobes, are scuteliform, nearly plane dorsally with a laminar border which continues from the thallus border, and bulging ventrally, covered with rhizoids. The sporophyte has a dehiscence line between two rows of yellow to orange coloured thick walled cells, seen in young capsules, as happens in *Notothylas*. The spores show on distal surface a number of rounded protuberances and

the proximal surface a conspicuous triradiate mark with margo, and triangular areas with a circle of distinct baculae. I place *Paraphymatoceros* into Notothykladaceae (Milde) Müll. Frib. ex Prosk. subfamily Phaeocerotoidae Hässel.

*Paraphymatoceros* comprises three species:

**1. *Paraphymatoceros diadematus* Hässel sp. nov.** Type: Chile, Quebrada Aguas Claras, s.d., *Villagrán 1115B* (STGO).

*Thallus angustus, tenuis, tuberis scutiformibus marginalibus et apicalibus viridulis vel auranticis. Cellulis 1 chloroplastis sine pirenoidibus. Dioica. Antheridia 4-5 per cavitate. Capsula stomatophora cum columella, superficie interna denigrata. Sporae et pseudoelateres nigrescentes, superficie distalis gibbosa, centrum areis triangularibus proximalibus baculis coronatis.*

Thalli strap shaped, crowded, or in rosettes, solid but thin, with scuteliform marginal and apical tubers, with *Nostoc* colonies; cells with 1 chloroplast without pirenoid. Dioicous. Antheridia 4-5 per cavity. Capsules abundant, long, pluristratose with stomata and columella; dehiscence line with border of orange coloured thick walled cells; cells of inner surface of valves dark brown at maturity of spores. Spores yellow, later blackish brown, distal surface with several irregular to 5 rounded protuberances and cingulum; proximal surface with triangular areas separated by a very distinct trilete mark and margo, in the center of the triangular areas a crown of baculae surrounding a depressed area (which gives the name of the species). Pseudoelaters blackish brown, 4 celled, disintegrating.

Other specimens examined: Chile, Cordoba, *Villagrán 1029, 1038* (STGO).

**2. *Paraphymatoceros hallii* (Austin) Hässel comb. nov.** Basionym: *Anthoceros hallii* Austin, Bull. Torrey Bot. Club 6: 26. 1875. Lectotypus: Oregon, Silverton. *E. Hall* (MANCH 21217 !); paratypes: Oregon, Salem, *E. Hall* (NY !), California, Marwin.; ≡ *Phaeoceros hallii* (Austin) Prosk., Bull. Torrey Bot. Club 78: 347, 1961; = *Anthoceros sulcatus* Austin, Bull. Torrey Bot. Club 6: 27. 1875.

Isotypi: Oregon, Salem on moist soil, *E. Hall* (MANCH 21223 !, NY !); ≡ *Notothylas hallii* Austin ms

Howe (1898) provided a detailed description of this species under the name *Anthoceros hallii* Austin. The tubers are described as lobes often terminating in irregular yellowish-brown to olive-green glandular thickenings, 2-3 mm broad, sometimes descending and tuber like. Spores were described and illustrated by Hässel de Menéndez (1989: 731, pl. 7 fig. 13 a-d).

**3. *Phymatoceros minutus* (Mitt.) Hässel comb. nov.** Basionym: *Anthoceros minutus* Mitt., J. Linn. Soc. Bot. 16: 195, 1877. Holotypus: Base of Table Mts., Cape of Good Hope, Rev. *A. E. Eaton* (NY!). ≡ *Notothylas minutus* (Mitt.) Steph. Spec. Hep. V:1021, 1916; ≡ *Phaeoceros minutus* (Mitt.) S.W.Arnell, ...South Africa 1963.

The morphology of this taxon was described by Mitten (1877:195, pl. V, fig. 5-9), emphasizing the the details of the thallus and the sporophyte, including the apex of the capsules. Tubers were not mentioned. Stephani (Species Hepaticarum V, 1916:997) described the taxon as *Anthoceros minutus* Mitt., citing Table Mountains and Venus Expedition. Stephani wrote "...ramis angustis, tuberiferis, tubera longe stipatis,... sporae fuscae, ... antheridia desunt." In the same volume Stephani (1916:1021) described the taxon under *Notothylas minutus* (Mitt.) Steph. from Mons. Tabularis, citing Mitten's publication. His diagnosis included "...frons solida, irregulariter multiramosa, sublacerata, marginibus tuberifera, sporae fuscae, androecia in ramulis propiis, sparsa, antheridia desunt." Arnell (1963:403, fig. 290) transferred the taxon to *Phaeoceros minutus* (Mitt.) S. W. Arnell, only indicating it as endemic in Cape Province, Peninsula. In addition to the former descriptions he noted "...the lobes entire with mucilaginous cavernae, smooth or covered with globose gemmae, sometimes with short tuberous marginal branches." Male plants are also mentioned, probably from other specimens not indicated there.

The type specimen has been analyzed by the present author. The thallus appears to be solid, thin, with *Nostoc* colonies, multiramose with narrow elongated expansions, which have at their tips, underneath,

the protruding tuber covered with rhizoids. The existence of a conical apex of the capsules, pointed out by Mitten and Arnell, was confirmed. Antheridia and gemmae have not been seen. The spores of the young sporophytes are yellow; the distal surface has nearly rounded protuberances, about 10 along the diameter; the proximal surface has a very distinct triradiate mark, margo and cingulum, and the triangular areas contain a ring of isolated baculae.

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